Practice Exam Answers

Section A

1.) Vertical stretch by 10
hor. shift right 1.5 (3/2)
ver. shift down 1

2.) inverse of each other
reflection through the line $y=x$
- you could explain a lot here.

3) $a=1, b=2$ or $a=2, b=1$

4) $\frac{\log 1200}{\log 9} = 3.227$

5) $(3x-7)\log 8 = (-x-1)\log 11$

$3x\log 8 - 7\log 8 = -x\log 11 - \log 11$

$3x\log 8 + x\log 11 = 7\log 8 - \log 11$

$x(3\log 8 + \log 11) = 7\log 8 - \log 11$

$x = \frac{7\log 8 - \log 11}{3\log 8 + \log 11}$

$= \frac{\log\left(\frac{8^7}{11}\right)}{\log(8^3 \cdot 11)}$

6) $30000 = 10000(2)^{t/d}$

$\frac{30000}{10000} = 2^{40/d}$

$3 = 2^{40/d}$

$\log 3 = \frac{40}{d}\log 2$

$d = \frac{40\log 2}{\log 3}$

$= 25.2 \text{ min.}$

7.) $\log[(3x+1)(x-1)] = \log(6x-1)$

$3x^2 - 2x - 1 = 6x - 1$

$3x^2 - 8x = 0$

$x(3x-8) = 0$

$x = 0$ or $x = 8/3$

$\leftarrow$ inadmissible

$\therefore x = 8/3$

<u>Check:</u> $\log(3(8/3)+1) + \log(8/3 - 1)$ $\left\{ \log[6(8/3)-1] \right.$

$\log(9) + \log(5/3)$ $\left. \log 15 \right\}$

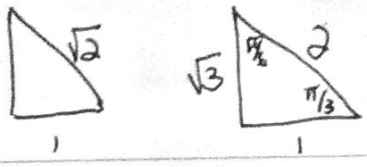
$\log(9 \cdot 5/3)$

$\log 15$

LS = RS

$\therefore x = 8/3$

8) a) $\log 5 = 0.699$
b) $\log 25 = 1.398$ (×2)
c) $\log 125 = 2.097$ (×3)
d) $\log 625 = 2.796$ (×4)
e) $\log 3125 = 3.495$ (×5)



Section B

1.) $\cos(\pi/4)\sin(\pi/6) + \cos(\pi/6)\sin(\pi/2)$

$= \left(\frac{1}{\sqrt{2}}\right)\left(\frac{1}{2}\right) + \left(\frac{\sqrt{3}}{2}\right)(1)$

$= \frac{1}{2\sqrt{2}} + \frac{\sqrt{3}}{2}$

$= \frac{1}{2\sqrt{2}} + \frac{\sqrt{3}\cdot\sqrt{2}}{2\cdot\sqrt{2}}$

$= \frac{1+\sqrt{6}}{2\sqrt{2}}$

2.) $f(x) = \cos(4x - \pi/2)$ Period $\frac{2\pi}{4} = \frac{\pi}{2}$

$f(x) = 8\cos(3x - \pi/2)$ Period $\frac{2\pi}{3}$

If this was Bob sitting on an innertube in a wave pool, he would be going up & down faster in the first function.

3.) Period of 4π

Vertical Asymptotes $\frac{\pi}{2} + n\pi$

4.) $\csc x = -\frac{2}{\sqrt{3}}$

$\frac{1}{\sin x} = \frac{-2}{\sqrt{3}}$

$\sin x = -\frac{\sqrt{3}}{2}$

→ sin is negative in

Q3	Q4
$\pi + \pi/3$	$2\pi - \pi/3$
$= 4\pi/3$	$= 5\pi/3$

if $\sin x = \frac{\sqrt{3}}{2}$ $x = \pi/3$ this is related acute angle.

5) $y = 8\sin 2x - A$

max at -5 with an amplitude of 8.
$\therefore$ EOA at -13

$8\sin 2x - 13$

6) $\cos(2x+1) = -\frac{1}{2}$

let $\theta = 2x+1$

$\cos\theta = -\frac{1}{2}$

$\cos\theta = \frac{1}{2}$

$\theta = \pi/3$ RAA.

cos is negative in Q2 and Q3

Q2: $\pi - \frac{\pi}{3}$ Q3: $\pi + \frac{\pi}{3}$

$\theta_1 = \frac{2\pi}{3}$ $\theta_2 = \frac{4\pi}{3}$

$2x+1 = \frac{2\pi}{3}$ $2x+1 = \frac{4\pi}{3}$

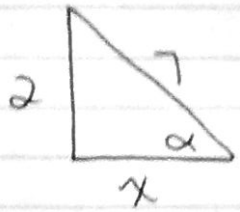
$2x = -\frac{\pi}{3}$ $2x = \frac{\pi}{3}$

$x = -\frac{\pi}{6}$ $x = \frac{\pi}{6}$

* 7.) $\sin(\alpha+\beta) = \sin\alpha\cos\beta + \sin\beta\cos\alpha$

need to find $\sin\beta$ & $\cos\alpha$

$\sin\alpha = \frac{2}{7} = \frac{O}{H}$

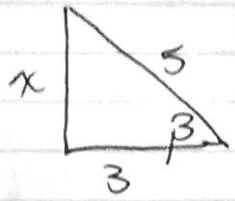


$x = \sqrt{7^2 - 2^2}$

$= \sqrt{45}$

$\cos\alpha = \frac{\sqrt{45}}{7}$

$\cos\beta = \frac{3}{5} = \frac{A}{H}$



$x = \sqrt{5^2 - 3^2}$

$= \sqrt{16}$

$= 4$